A FURTHER CONTRIBUTION TO THE STUDY OF THE "PARADOXIC REFLEX."

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In October 1904 (*American Medicine,* Dec. 3, 1904, p. 971 and Journal of Nervous and Mental Disease, Feb. 1905, p. 123) I demonstrated before this Society a new reflex to which I gave the name "paradoxic flexor reflex." I then presented my observations of 30 organic cases in which this reflex was evident. I found it always associated with other symptoms characteristic of involvement of the motor tract, viz., exaggerated knee-jerks, ankle-clonus and *sometimes* with Babinski's sign. As to the latter, I observed then that in the majority of the cases there was a sort of antagonism between the paradoxic and the "phénomène des orteils:" while one was present, the other was absent. I have often stated that a great many functional and perfectly normal cases were examined by me and the paradoxic reflex could at *no time* be elicited.

Now I bring before you the result of my further observations on the subject. They embrace 58 cases of organic nervous diseases in which all the evidences pointed to an involvement of the motor tract. They are distributed as follows: transverse myelitis 15, amyotrophic lateral sclerosis 8, hemiplegia 20, Jacksonian epilepsy with paresis on the same side 6, one case of essential epilepsy, disseminated sclerosis 2, cerebro-spinal syphilis 6. As in 1904 I found here the paradoxic reflex present in all the 20 cases of hemiplegia, but more frequently on the non-paralyzed side than on the affected side: 15 to 10. In these 15 cases Babinski's sign was absent on the non-paralyzed side. As to the paralyzed side, when the Babinski sign was pronounced, the paradoxic reflex was absent, when mild the paradoxic reflex was present. The latter fact was observed in 8 cases out of 10.

The same observation as to the relation of Babinski's sign to the paradoxic reflex was made in amyotrophic lateral sclerosis and disseminated sclerosis. In the cases of transverse myelitis the following peculiarity was noticed. Seven out of 15 cases came under my observation at the beginning of their affection. Two of them presented a history of exposure to cold, 5 were traumatic in origin. Here the antagonism between the two reflexes was very marked: at first Babinski's sign was absent on one or both sides and the paradoxic reflex was present; about two or three months later Babinski's sign made its appearance, the paradoxic reflex completely disappeared or was faintly present. However in two cases both reflexes remained permanently together. In one case of cerebro-spinal syphilis in which the spinal symptoms were the most conspicuous, an energetic mercurial treatment was instituted. The patient's mental functions, the ataxia and the sphincters improved considerably. The knee-jerks however remained markedly exaggerated, ankle-clonus was present on one side, but Babinski's sign disappeared on one side and was only slightly preserved on the other; the paradoxic reflex remained intact and was easily obtainable. The interesting and important observation upon which I lay special stress was that concerning the reflexes in cases of Jacksonian epilepsy. When the examination was made immediately or shortly after the attacks the knee-jerk was exaggerated and the paradoxic reflex was easily elicited in all the cases, while Babinski's sign was in some cases only slightly present (3) and in others (2) absent. In one case a boy of 12 was ill with typhoid fever. He then developed meningeal symptoms, during which he had an attack of epileptiform convulsions on the right side, which were followed by paralytic symptoms on the same side. I had an opportunity to examine the little patient twice at an interval of two weeks. On both occasions the right knee-jerk was markedly exaggerated, there was no ankle-clonus and no Babinski's sign but the paradoxic reflex was present and easily elicited. The patient recovered completely, the paralytic symptoms, the exaggerated knee-jerk and the paradoxic reflexes disappeared. I have at present under obsevation a middle aged woman suffering from essential epilepsy. Whenever I examine her immediately after an attack, both knee'jerks are greatly exaggerated and paradoxic reflex is inevitably present, but at no time I observed in her Babinski's sign.

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*The paper was read and cases were exhibited at the December meeting of the Philadelphia Neurological Society.

An impartial analysis of all the facts observed leads to the following deductions. The paradoxic reflex is a valuable sign for diagnostic purposes at the beginning of an organic affection showing that the motor tract is being *irritated*. As proof I offer at least the above cited facts of focal and essential epilepsy. While Babinski's sign is of inestimable value in cases of a well established *lesion* of the motor tract, the paradoxic reflex is a sign, to say the least, of a transient irritation or of a slight lesion of the same tract. The above mentioned antagonism between these two reflexes, also the presence of the paradoxic reflex on the nonparalyzed side in hemiplegia is a proof of my assertion. I hasten moreover to remark that while the "antagonism" was present in the majority of my cases, nevertheless in some both reflexes were present together and obtainable to the same extent.

As is well known, Oppenheim obtained extension of the toes by passing the handle of the percussion hammer along the inner border of the tibia. This phenomenon is known as "Oppenheim's reflex." Similarly to Babinski's sign, it is observed, according to the author, in diseases in which the motor tract is involved. Oppenheim's statement was verified and corroborated by some observers. It is not present in every case, but when it is present, it always accompanies other symptoms, as exaggerated knee-jerk, or Babinski's sign. The only obscure point about this reflex is its mechanism, as it is difficult to say whether the extension of the toes is due to the excitation of the skin along the inner border of the tibia or of the musculature of the vicinity. The paradoxic reflex is obtainable exclusively by deep pressure of the deep muscles of the calf of the leg, viz., the flexor muscles; the ends of the fingers must be placed directly upon the middle of the posterior aspect of the leg. It is, therefore, in my judgment, a distinct reflex and totally different from Oppenheim's or any other described. As some sceptical neurologists may not be entirely satisfied with the above mentioned distinction between the two reflexes, I made a statistical study of the relation of the paradoxic reflex to Oppenheim's reflex. It is remarkable that in a large number of my cases (41) Oppenheim's reflex could not be elicited at all, in some cases (5) it was present together with Babinski's sign and the paradoxic reflex; and in some cases (12) was absent when the paradoxic reflex was present. I endeavored to obtain Oppenheim's reflex in those cases of epilepsy in which the paradoxic reflex together with exaggerated knee-jerks was present immediately after the seizures, but the results were negative.

The two cases I have the pleasure to exhibit illustrate to the best possible advantage the relation of the two reflexes. One is a case of diplegia, in which the knee-jerks are exaggerated, ankle-clonus and Babinski's sign are present on both sides; Oppenheim's reflex is not obtainable, paradoxic reflex is easily elicited on both sides. The other case is one of cerebrospinal syphilis, in which the knee-jerks and ankle-clonus are markedly exaggerated on both sides, but there is no Oppenheim's reflex while the paradoxic reflex is distinct and easily obtainable on both sides.

In conclusion I will say that in my judgment the paradoxic reflex is a delicate sign which has its diagnostic value, if it is taken in the sense I attribute to it, viz., as a sign of irritation or early stage of a lesion of the motor tract. To elicit it requires a little experience and it will be frequently observed, if the rules laid down by me previously are strictly adhered to.

I may also add that a series of 150 normal cases and 55 cases of functional nervous diseases were examined with absolutely negative results.